USVF

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BESCHREIBUNG

INSTRUCT. BOOK

USVF

MP MASTER

MA23794

Instruction Book

SELECTIVE UHF VOLTMETER

Type USVF BN 15285/50and/60

Voltmeter for relative
voltage measurements
in TV Bands IV and V

R 8007
1162
Bl. 1
(20 Bl.)

Note: Always quote the Type and Order Number (BN) in addition to the Serial Number (FNr.) of the set when asking for technical information and, in particular, when ordering repair parts.

Edition R 8007/1162

(Translation of the German edition R 7932/962)

1. Specifications

Frequency range	for 40 channels of the TV Bands IV and V, 463 to 791 Mc
Tuning range in each channel	±8 Mc (0 Mc = picture carrier frequency)
Voltage range	0.3 mv to 1.5 v divided into 5 steps of 10 db each; continuous control covering 30 db
Voltage-ratio range	up to 70 db
Input	R&S connector Dezifix B, adaptable to other plug- and socket-systems
Input impedance	50 Ω ±2% for BN 15285/50 60 Ω ±2% for BN 15285/60
IF bandwidth	8 kc
Selectivity	over 20 db at ±7.5 kc over 60 db at ±20 kc
Voltage-ratio indication	by COARSE gain control (0/-10/-20/-30/-40/-50 db) and meter (-20 to +2 db)
Type of rectification	peak-to peak
Calibration	in rms values
Frequency response of voltage indication	±1% per Mc
Power supply	115/125/220/235 v 47 to 63 cps (70 va)
Valves, etc.	2 valves EC 93 3 valves ECC 81 3 valves EF 94 2 valves EF 800 1 valve EF 804 S 2 valves EL 86 1 valve EF 80 1 reference tube 85 A 2 1 miniature glow lamp RL 210 1 0.4-amp fuse 0,4 C DIN 41571
Dimensions	
Weight	

R 8007
1162
Bl. 2

2. Uses

The Selective VHF Voltmeter Type USVF BN 15285 is a tunable voltmeter for relative voltage measurements specially designed for television applications. Its frequency range covers the 40 channels of the TV Bands IV and V. Its high selectivity and wide voltage range make the instrument suitable, for example, for the following measurements:

(a) Measurement of the amplitude ratio of the picture and sound carriers.

(b) Point-by-point measurement of the energy distribution within the sidebands of the picture carrier (-8 to 0 to +8 Mc).

(c) Measurement of modulation depth.
The carrier amplitude E and the two sideband amplitudes A and B are measured. The modulation depth m (in %) is determined from

$$m = \frac{A + B}{E} \times 100.$$

(d) Measurement of the modulation distortion. The amplitude A_o of the fundamental wave (= carrier frequency + desired modulation frequency = $f_o + f_m$) and the amplitudes A_1, A_2, etc. of the harmonics ($f_o + 2f_m$, $f_o + 3f_m$) are measured. The modulation distortion k (in %) is determined from

$$k = \frac{\sqrt{A_1^2 + A_2^2 \ldots}}{\sqrt{A_0^2 + A_1^2 + A_2^2 \ldots}} \times 100.$$

(e) Linearity measurements.

(f) Measurement of interference from adjacent channels.

3. Description (see block diagram and circuit diagram)

The Selective VHF Voltmeter Type USVF BN 15285 built for the TV Bands IV and V is a superheterodyne receiver with threefold frequency conversion. The mixer diode G14 serves for the first frequency conversion to 70 Mc. The associated local oscillator Rö2 is provided with a tuning scale (channel selector) which permits the channel to be selected. The local oscillator operates 70 Mc above the received frequency in the TV Band IV and 70 Mc below the received frequency in the TV Band V. Consequently, the sidebands of the TV Band V are in opposed arrangement to the sidebands of the TV Band IV. The upper sideband of the TV Band IV corresponds to the lower sideband of the TV Band V. The scale of the TV Band IV is marked black, that of the TV Band V red to avoid confusion of the TV bands.

Three amplifier stages, Rö1-Rö3-Rö4, with 6 stagger-tuned circuits and a bandwidth of 16 Mc follow the mixer diode G14. The second frequency conversion to 30 Mc is performed in the mixer Rö5. Its local oscillator Rö6 is variable by ± 8 Mc. Thus it is possible to tune in all frequencies ($f_o \pm 8$ Mc) which may be contained in one channel.

A multi-section 30-Mc IF filter with a bandwidth of approximately 150 kc is followed by the mixer Rö7I for the third frequency conversion to 1.65 Mc. The associated local oscillator Rö7II is an overtone crystal oscillator with an output frequency of 31.65 Mc. A low-resistance attenuator, inserted after this mixer between two impedance transformers, permits the sensitivity of the instrument to be reduced by accurately-known amounts in 5 10-db steps. Potentiometer R44, connected between the first (Rö8I) and second (Rö8II) 1.65-Mc IF stages, provides for further reduction in sensitivity. Its range of variation is about 30 db. The 5-step attenuator is marked GAIN COARSE on the front panel, the potentiometer GAIN FINE.

After further amplification by the stages Rö9-Rö10-Rö11 the IF voltage is rectified by G12 and indicated by the moving-coil meter I1 whose scale is calibrated from -20 to +2 db. The 1.65-Mc IF amplifier, which determines the selectivity of the instrument, has a bandwidth of 8 kc.

R 8007
1162
Bl. 4

To measure a voltage ratio proceed as follows: Tune by means of the channel selector and the ± 8-Mc scale to the frequency of the higher of the two voltages and adjust the gain controls COARSE and FINE in such a way that the meter deflects to 0 (reference component). Then tune with the ± 8-Mc scale to the frequency of the smaller voltage and increase the gain with the control GAIN

COARSE so far that a readable meter deflection results. Now add the db value read from the meter (-20 to +2 db) to the db value by which the switch position has been varied, e.g., 20 db, if switched from -10 db to -30 db, to obtain the voltage ratio.

The frequency response of the voltage indication of less than ±1% per Mc, stated under "1. Specifications", originates mainly from the 70-Mc band-pass filter located between the first (G14) and the second (Rö5) mixer. It is so small that voltage ratios are still accurately measurable at frequencies that lie at the limits of a television channel.

To permit monitoring of the amplitude modulation of a transmitter, the AF voltage tapped from potentiometer R62 which follows the diode G12 is applied to the grid of the second section of Rö11, derived from its cathode and applied to the monitoring output. Due to this cathode follower, the meter reading remains completely unaffected by the load on the monitoring output.

The power section is designed for operation from AC supply voltages of 115, 125, 220 and 235 v. The secondary side of the power transformer comprises the heater windings for all valves and an anode-supply winding. The voltage of the anode-supply winding is rectified by G13, filtered by L40-C100 and stabilized by Rö12-Rö13-Rö14-Rö15. Rö12-Rö13 are the (parallel-connected) current regulating valves through which passes the entire anode current, Rö14 is the control valve of Rö12-Rö13, and Rö15 is a highly stable reference tube maintaining a given grid bias for Rö14.

4. Operating Instructions

The instrument leaves the factory adjusted for operation from a 220-v AC supply. To adapt it for 115, 125 or 235 v, remove the cheese-head screws at the left-hand edges of the front panel (if the voltmeter is housed in a cabinet) and withdraw the chassis from its cabinet. Insert a suitable fuse into the pair of contact clips marked with the local AC supply voltage on the fuse panel beside the power transformer. For 235 v use the 400-ma fuse. Insert a 1-amp fuse for 115 or 125 v.

Place the chassis back into the cabinet, connect to the AC supply and switch on with the toggle switch located in the lower right-hand corner of the front panel. The glow lamp above the switch serves as voltage indicator.

Before switching on, check that the pointer of the meter is at the mechanical zero. This is the point 0 of the scales divided 0 to 10 and 0 to 3. Correct with the screw-driver adjustment recessed in the meter housing. When the instrument is switched on, the zero may be checked and corrected while the GAIN FINE knob is turned fully counterclockwise.

To measure, for example, the amplitude ratio of the picture and sound carriers, proceed as follows: Apply the input voltage to the input via a coaxial 50-Ω or 60-Ω cable (depending upon BN) and set the scale calibrated from -8 to +8 Mc to 0 Mc. Place the GAIN COARSE switch in the -50 db position and turn the GAIN FINE knob fully clockwise. Put the pointer of the channel selector (round scale) to the middle of the mark of the channel to be measured. Slowly turn the fine drive knob of this scale while observing the meter, until the picture carrier is found. The IF bandwidth being 8 kc, this setting requires a careful adjustment.

Set the GAIN COARSE switch to "0 db" and adjust the fine drive knob of the channel selector for maximum deflection on the meter. Adjust the GAIN FINE knob so that the maximum deflection is at 0 db (reference point for picture carrier). Should the given input voltage not be sufficient, set the GAIN COARSE switch to a more sensitive step (e.g. -10 db or -20 db) and make the adjustments as described. If the picture carrier is modulated, slowly turn the pointer of the -8 to +8-Mc scale through to about ±1 Mc and check that it is the picture carrier that has been tuned in and not one of the sidebands, which always have lower amplitudes. Do not change the setting of the GAIN FINE knob after this adjustment of the reference point.

R 8007
1162
Bl. 6

Shift the pointer of the frequency scale by the frequency spacing between the picture and sound carriers (+5.5 Mc) and tune to the sound carrier. Then the amplitude ratio between the picture and sound carriers can be read on the scale calibrated -20 to +2 db if it does not exceed 20 db. For accurate measurement or for the measurement of a greater amplitude ratio set the GAIN COARSE switch to a step where the greatest possible meter deflection is obtained. Add the db value by which the new setting differs from the reference-point setting to the db value read on the meter. If, for example, the meter deflection is 0 db and the switch position -10 db for the picture carrier, whereas for the sound carrier the deflection is +1 db and the switch position -30 db, then the amplitude ratio is 19 db.

If the full-scale value (+2 db) is taken as reference point for the measurement and if the full range (50 db) of the GAIN COARSE switch is used, then an overall measurement range of 72 db is available, i.e. voltage ratios up to 1:0.0002 are measurable. This holds provided that the frequencies of the amplitudes are not too high and spaced apart far enough.

When measuring in the vicinity of the carrier (at 500 to 30 kc distance) the amplitudes of the carrier and of the sideband must not be greater than 1 v. The same holds if a second (unmodulated) carrier is used instead of the sideband amplitude generated by modulation. If necessary, insert an attenuator pad between the transmitter and the input of the Type USVF, which reduces too high a voltage to a suitable amount. For this purpose, we recommend one of our UHF Attenuators Type DPF with a characteristic impedance of 50 Ω or 60 Ω (depending upon BN of the USVF): BN 18060/50 with Z = 50 Ω and an attenuation of 5 db, BN 18061/50 with Z = 50 Ω and 10 db, BN 18062/50 with Z = 50 Ω and 20 db, BN 18060/60 with Z = 60 Ω and 5 db, BN 18061/60 with Z = 60 Ω and 10 db, BN 18062/60 with Z = 60 Ω and 20 db.

Greater amplitude ratios, up to about 82 db, can also be measured. One only has to mark the angle of rotation of the GAIN FINE knob which corresponds to a given value, say 10 db. After the reference-point setting has been carried out, turn the knob clockwise by the marked db value. This increases the gain and extends the overall range of measurement by the same db value. A high enough input voltage must of course be available as reference component. This voltage should, however, not exceed 1.5 v.

8007
162
1. 7

The measurement of modulation depth and of modulation distortion is described in section 2. When measuring modulation depth, the frequency spacings between the carrier and the sidebands must be greater, the smaller the modulation depth to be measured. Refer to the data given in "1. Specifications" for IF bandwidth and selectivity.

5. Replacement of Valves

All valves of the instrument, except Rö3 and Rö4 (type according to table of replaceable parts and circuit diagram), may be replaced by the same type, no adjustment being necessary.

After replacement of valves Rö3 and Rö4 it may be necessary to tune the circuits between Rö1 and Rö5 since the circuit capacitances are mainly determined by the electrode capacitances of the valves. To reestablish the original pass-band characteristic, special measuring facilities are necessary which mostly will not be at hand for the user of this instrument. We recommend to turn the instrument in to ROHDE & SCHWARZ if after a long time of operation replacement of these two valves should be required.

8007
1162
Bl. 8

6. Table of Replaceable Parts

Ref. No.	Designation	Ratings	R&S Stock No.
C1	Capacitor, ceramic	330 pf	CCG 94/330
C2	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C3	Capacitor, ceramic	2200 pf	CCG 94/2200
C4	Capacitor, ceramic	330 pf	CCG 94/330
C5	Capacitor, ceramic	10 pf	CCG 41/10
C6	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C7	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C8	Capacitor, feed-through ceramic	5000 pf/500 v	CFR 1/5000/500
C9	Capacitor, ceramic	6 pf	CCG 41/6
C10	Capacitor, ceramic	6 pf	CCG 41/6
C11	Filter, feed-through, VHF		DFP 13502
C12	Capacitor, variable		E 392/3-4.2./5 + 4.6.2/5
C13	Trimmer, tubular, ceramic	2 pf	CV 7202
C14	Filter, feed-through, VHF		DFP 13502
C15	Capacitor, ceramic	1000 pf	CCG 94/1000
C16	Capacitor, ceramic	1000 pf	CCG 94/1000
C17	Capacitor, ceramic	1000 pf	CCG 94/1000
C18	Capacitor, ceramic	10 pf	CCG 41/10
C19	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C20	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C21	Capacitor, ceramic	1000 pf	CCG 94/1000
C22	Capacitor, ceramic	1000 pf	CCG 94/1000
C23	Capacitor, ceramic	1000 pf	CCG 94/1000

8007
162
1.9

Ref. No.	Designation	Ratings	R&S Stock No.
C24	Capacitor, ceramic	10 pf	CCG 41/10
C25	Capacitor, ceramic	4 pf	CCG 41/4
C27	Capacitor, ceramic	6 pf	CCG 41/6
C28	Capacitor, ceramic	2 pf	CCG 41/2
C29	Capacitor, ceramic	470 pf	CCG 94/470
C30	Capacitor, ceramic	8 pf	CCG 41/8
C31	Capacitor, ceramic	2 pf	CCG 41/2
C32	Capacitor, ceramic	12 pf	CCH 31/12
C33	Capacitor, ceramic	2 pf	CCG 41/2
C34	Capacitor, ceramic	2 pf	CCG 41/2
C35	Capacitor, ceramic	12 pf	CCH 31/12
C36	Capacitor, ceramic	12 pf	CCH 31/12
C37	Capacitor, ceramic	470 pf	CCG 94/470
C38	Capacitor, ceramic	470 pf	CCG 94/470
C39	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C40	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C41	Capacitor, ceramic	8 pf	CCG 41/8
C42	Capacitor, ceramic	1000 pf	CCG 94/1000
C43	Capacitor, variable		E 392/3-4.10
C44	Capacitor, ceramic	0.5 + 1 pf	CCG 11/0,5 + CCG 11/1
C45	Capacitor, ceramic	5 pf	CCG 41/5
C46	Capacitor, ceramic	1000 pf	CCG 94/1000
C47	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C48	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C49	Capacitor, ceramic	10 pf	CCG 41/10
C50	Capacitor, ceramic	18 pf	CCH 31/18

R 8007
1162
Bl. 10

Ref. No.	Designation	Ratings	R&S Stock No.
C51	Trimmer, air	4 to 29 pf	CV 8025
C52	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C53	Capacitor, ceramic	10 pf	CCG 41/10
C54	Capacitor, ceramic	15 pf	CCG 68/15
C55	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C56	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C57	Capacitor, ceramic	2 pf	CCG 41/2
C58	Capacitor, ceramic	15 pf	CCH 31/15
C59	Capacitor, ceramic	2200 pf	CCG 94/2200
C60	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C61	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C62	Trimmer, air	4 to 29 pf	CV 8025
C63	Capacitor, ceramic	10 pf	CCG 41/10
C64	Capacitor, synth. foil	100 pf/500 v	CKD 2/100/500
C65	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C66	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C67	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C68	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C69	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C70	Trimmer, air	4 to 29 pf	CV 8025
C71	Trimmer, tubular, ceramic	2 pf	CV 7202
C72	Trimmer, air	4 to 29 pf	CV 8025
C73	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C74	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500

8007
162
l. 11

Ref. No.	Designation	Ratings	R&S Stock No.
C75	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C76	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C78	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C79	Trimmer, air	4 to 29 pf	CV 8025
C80	Trimmer, tubular, ceramic	2 pf	CV 7202
C81	Trimmer, air	4 to 29 pf	CV 8025
C82	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C83	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C84	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C85	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C86	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C87	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C88	Trimmer, air	4 to 29 pf	CV 8025
C89	Trimmer, tubular, ceramic	2 pf	CV 7202
C90	Trimmer, air	4 to 29 pf	CV 8025
C91	Capacitor, ceramic	220 pf	CCH 31/100 CCH 31/120 parallel
C92	Capacitor, ceramic	220 pf	CCH 68/220
C93	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C94	Capacitor, ceramic	100 pf	CCH 68/100
C95	Capacitor, paper	10,000 pf/250 v	CPK 10 000/250
C96	Capacitor, paper	100,000 pf/250 v	CPK 100 000/250
C97	Capacitor, feed-through, ceramic	5000 pf/500 v	CFR 1/5000/500
C98	Capacitor, MP	1 µf/250 v	CMR 1/250
C99	Capacitor, ceramic	100 pf	CCH 68/100

8007
162
1. 12

Ref. No.	Designation	Ratings	R&S Stock No.
C100	Capacitor, electrolytic	25 µf/500 v	CEG 21/25 + 25/500
C101		25 µf/500 v	
C102	Capacitor, ceramic	470 pf	CCG 94/470
C103	Capacitor, ceramic	2 pf	CCG 41/2
C104	Capacitor, ceramic	factory-adjusted approx. 220 pf	CCG 91/220
C105	Capacitor, ceramic	1000 pf	CCG 94/1000
G11	Diode, germanium		GK/GD 8 E
G12	Diode, germanium		GK 2591
G13	Rectifier, selenium	2 x 360 v/85 ma	GN 19/720/85 M
G14	Diode, silicon		GK 1011 C
I1	Meter		INS 30103
K1	Cable, 60-Ω		LK 126/6
L1	Choke, RF		E 392/3 - 4.20
L2	Choke, RF		E 392/3 - 4.20
L3	Choke, RF		E 392/3 - 4.21
L4	Choke, RF		E 392/3 - 4.21
L5	Choke, RF		E 392/3 - 4.21
L6	Coil (band-pass filter)		E 392/3 - 4.22/5
L7	Coil (band-pass filter)		E 392/3 - 4.22/5
L8	Coil (band-pass filter)		E 392/3 - 4.22/5
L9	Coil (band-pass filter)		E 392/3 - 4.22/5
L10	Coil (band-pass filter)		E 392/3 - 4.22/5
L11	Coil (band-pass filter)		E 392/3 - 4.22/5
L12	Coil, 30-Mc, filter		E 392/3 - 4.24/5
L13	Coil, 30-Mc, filter		E 392/3 - 4.24/5
L14	Coil, 30-Mc, filter		E 392/3 - 4.24/5

8007
162
1. 13

Ref. No.	Designation	Ratings	R&S Stock No.
L15	Coil, 30-Mc, filter		E 392/3 - 4.24/5
L16	Coil, oscillator		E 392/3 - 4.2.3/5
L17	Choke, VHF		DUF 311/20
L18	Choke, VHF		DUF 311/20
L19	Choke, VHF		DUF 311/20
L20	Choke, VHF		DUF 311/20
L21	Choke, VHF		DUF 311/20
L22	Choke, VHF		DUF 311/20
L23	Choke, VHF		DUF 311/20
L24	Choke, VHF		DUF 311/20
L25	Choke, VHF		DUF 311/20
L26	Coil, crystal oscillator		E 392/3 - 3.12
L27	Coil, 30-Mc, filter		E 392/3 - 4.24/5
L28	Coil, IF transformer		E 392/3 - 16.1
L29	Coil, IF transformer		E 392/3 - 16.1
L30	Coil, IF filter		E 392/3 - 5.1/5 Bl. 1 E 392/3 - 5.1/5 Bl. 2
L31	Coil, IF filter		E 392/3 - 5.2/5 Bl. 1 E 392/3 - 5.2/5 Bl. 2
L32	Choke, VHF		DUF 311/20
L33	Coil, IF filter		E 392/3 - 5.1/5 Bl. 1 E 392/3 - 5.2/5 Bl. 2
L34	Coil, IF filter		E 392/3 - 5.2/5 Bl. 1 E 392/3 - 5.2/5 Bl. 2
L35	Choke, VHF		DUF 311/20
L36	Coil, IF filter		E 392/3 - 5.1/5 Bl. 1 E 392/3 - 5.2/5 Bl. 2
L37	Coil, IF filter		E 392/3 - 5.2/5 Bl. 1 E 392/3 - 5.2/5 Bl. 2
L38	Choke, VHF		DUF 311/20

Ref. No.	Designation	Ratings	R&S Stock No.
L39	Choke, VHF		DUF 311/20
L40	Choke, power		DB 125/2
L41	Choke, RF		E 392/3 - 4.25
Q	Crystal, overtone	31.65 Mc	QA 23020/31650
R1	Resistor, depos. carbon	80 Ω/0.1 w	WF 80/0,1
R2	Resistor, depos. carbon	100 kΩ/0.1 w	WF 100 k/0,1
R3	Resistor, depos. carbon	200 Ω/0.1 w	WF 200/0,1
R4	Resistor, depos. carbon	1 kΩ/0.1 w	WF 1 k/0,1
R5	Resistor, depos. carbon	300 Ω/0.1 w	WF 300/0,1
R6	Resistor, depos. carbon	5 kΩ/0.1 w	WF 5 k/0,1
R7	Resistor, depos. carbon	1 kΩ/0.1 w	WF 1 k/0,1
R8	Resistor, depos. carbon	300 Ω/0.1 w	WF 300/0,1
R9	Resistor, depos. carbon	5 kΩ/0.1 w	WF 5 k/0,1
R10	Resistor, depos. carbon	1 kΩ/0.1 w	WF 1 k/0,1
R11	Resistor, depos. carbon	2.5 kΩ/0.1 w	WF 2,5 k/0,1
R12	Resistor, depos. carbon	100 kΩ/0.1 w	WF 100 k/0,1
R13	Resistor, depos. carbon	500 kΩ/0.1 w	WF 500 k/0,1
R14	Resistor, depos. carbon	60 Ω/0.1 w	WF 60/0,1
R15	Resistor, depos. carbon	200 kΩ/0.1 w	WF 200 k/0,1
R16	Resistor, depos. carbon	1 kΩ/0.1 w	WF 1 k/0,1
R17	Resistor, depos. carbon	10 kΩ/0.1 w	WF 10 k/0,1
R18	Resistor, depos. carbon	1 kΩ/0.5 w	WF 1 k/0,5
R19	Resistor, depos. carbon	100 kΩ/0.1 w	WF 100 k/0,1
R20	Resistor, depos. carbon	6 kΩ/1 w	WF 6 k/1
R21	Resistor, depos. carbon	10 Ω/1 w	WF 10/1
R22	Resistor, depos. carbon	50 kΩ/0.5 w	WF 50 k/0,5
R23	Resistor, depos. carbon	5 kΩ/1 w	WF 5 k/1

8007
162
1.15

Ref. No.	Designation	Ratings	R&S Stock No.
R24	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R25	Resistor, depos. carbon	20 kΩ/0.1 w	WF 20 k/0,1
R26	Resistor, depos. carbon	5 kΩ/0.25 w	WF 5 k/0,25
R27	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R28	Resistor, depos. carbon	200 Ω/0.25 w	WF 200/0,25
R29	Resistor, depos. carbon	1 kΩ/0.25 w	WF 1 k/0,25
R30	Resistor, wire-wound, variable	500 Ω lin.	WR 4 F/500
R31	Resistor, depos. carbon	170.8 Ω ±1%/0.1 w	WF 170,8/1/0,1
R32	Resistor, depos. carbon	115.6 Ω ±1%/0.1 w	WF 115,6/1/0,1
R33	Resistor, depos. carbon	115.6 Ω ±1%/0.1 w	WF 115,6/1/0,1
R34	Resistor, depos. carbon	170.8 Ω ±1%/0.1 w	WF 170,8/1/0,1
R35	Resistor, depos. carbon	115.6 Ω ±1%/0.1 w	WF 115,6/1/0,1
R36	Resistor, depos. carbon	170.8 Ω ±1%/0.1 w	WF 170,8/1/0,1
R37	Resistor, depos. carbon	115.6 Ω ±1%/0.1 w	WF 115,6/1/0,1
R38	Resistor, depos. carbon	170.8 Ω ±1%/0.1 w	WF 170,8/1/0,1
R39	Resistor, depos. carbon	115.6 Ω ±1%/0.1 w	WF 115,6/1/0,1
R40	Resistor, depos. carbon	100 kΩ/0.1 w	WF 100 k/0,1
R41	Resistor, depos. carbon	1 kΩ/0.25 w	WF 1 k/0,25
R42	Resistor, depos. carbon	5 kΩ/0.25 w	WF 5 k/0,25
R43	Resistor, depos. carbon	10 Ω/0.25 w	WF 10/0,25
R44	Resistor, depos. carbon, variable	1 kΩ lin.	WS 7126/1 k
R45	Resistor, depos. carbon	200 Ω/0.25 w	WF 200/0,25
R46	Resistor, depos. carbon	1 kΩ/0.5 w	WF 1 k/0,5
R47	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R48	Resistor, depos. carbon	300 Ω/0.25 w	WF 300/0,25
R49	Resistor, depos. carbon	5 kΩ/0.25 w	WF 5 k/0,25
R50	Resistor, depos. carbon	1 kΩ/0.5 w	WF 1 k/0,5

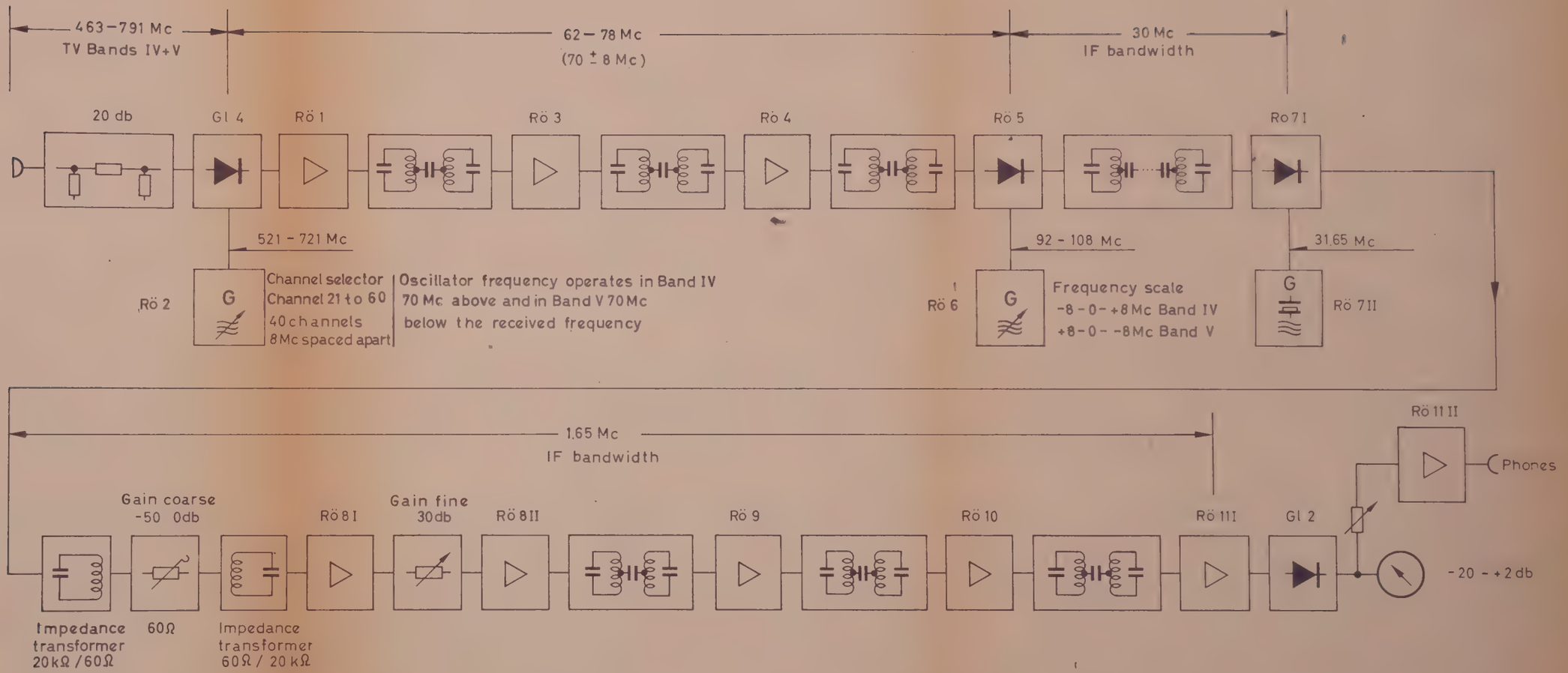
R 8007
1162
Bl. 16

Ref. No.	Designation	Ratings	R&S Stock No.
R51	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R52	Resistor, depos. carbon	200 Ω/0.25 w	WF 200/0,25
R53	Resistor, depos. carbon	5 kΩ/0.25 w	WF 5 k/0,25
R54	Resistor, depos. carbon	1 kΩ/0.5 w	WF 1 k/0,5
R55	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R56	Resistor, depos. carbon	200 Ω/0.25 w	WF 200/0,25
R57	Resistor, depos. carbon	5 kΩ/0.5 w	WF 5 k/0,5
R58	Resistor, depos. carbon	500 Ω/0.25 w	WF 500/0,25
R59	Resistor, depos. carbon	1 MΩ/0.25 w	WF 1 M/0,25
R60	Resistor, depos. carbon	100 kΩ/0.25 w	WF 100 k/0,25
R61	Resistor, depos. carbon	100 Ω/0.25 w	WF 100/0,25
R62	Resistor, depos. carbon, variable	100 kΩ lin.	WS 7126/100 k
R63	Resistor, depos. carbon	40 kΩ/0.25 w	WF 40 k/0,25
R64	Resistor, depos. carbon	5 kΩ/0.25 w	WF 5 k/0,25
R65	Resistor, depos. carbon	1 kΩ/0.25 w	WF 1 k/0,25
R66	Resistor, depos. carbon	8 kΩ/0.25 w	WF 8 k/0,25
R67	Resistor, depos. carbon	1 kΩ/0.25 w	WF 1 k/0,25
R68	Resistor, depos. carbon	600 kΩ/0.25 w	WF 600 k/0,25
R69	Resistor, depos. carbon	20 kΩ/0.25 w	WF 20 k/0,25
R70	Resistor, depos. carbon	1 MΩ/0.25 w	WF 1 M/0,25
R71	Resistor, depos. carbon, variable	10 kΩ lin.	WS 9122 F/10 k
R72	Resistor, depos. carbon	50 kΩ/0.25 w	WF 50 k/0,25
R73	Resistor, depos. carbon, variable	25 kΩ lin.	WS 9122 F/25 k
R74	Resistor, depos. carbon	50 kΩ/0.25 w	WF 50 k/0,25
R75	Resistor, depos. carbon	170.8 Ω ±1%/0.1 w	WF 170,8/1/0,1
R76	Resistor, depos. carbon	79 Ω ±1%/0.1 w	WF 79/1/0,1

R 8007
:162
31. 17

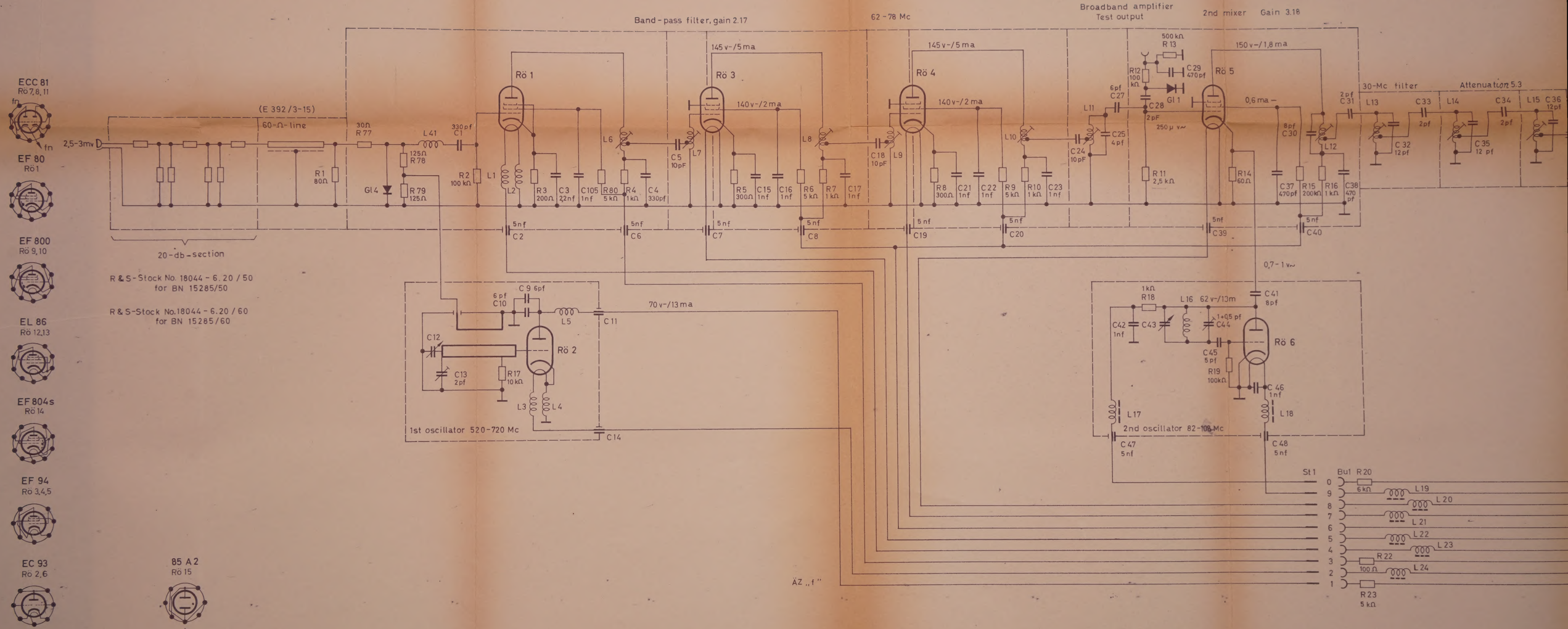
Ref. No.	Designation	Ratings	R&S Stock No.
R77	Resistor, depos. carbon	30 Ω/0.1 w	WF 30/0,1
R78	Resistor, depos. carbon	125 Ω/0.1 w	WF 125/0,1
R79	Resistor, depos. carbon	125 Ω/0.1 w	WF 125/0,1
R80	Resistor, depos. carbon	5 kΩ/0.1 w	WF 5 k/0,1
Rl1	Lamp, glow, miniature	220 v	RL 210
Rö1	Pentode		EF 80
Rö2	Triode		EC 93
Rö3	Pentode		EF 94
Rö4	Pentode		EF 94
Rö5	Pentode		EF 94
Rö6	Triode		EC 93
Rö7	Triode, twin		ECC 81
Rö8	Triode, twin		ECC 81
Rö9	Pentode		EF 800
Rö10	Pentode		EF 800
Rö11	Triode, twin		ECC 81
Rö12	Pentode		EL 86
Rö13	Pentode		EL 86
Rö14	Pentode		EF 804 S
Rö15	Reference tube		85 A 2
S1	Switch, midget step		SRW 14121
S2	Power switch (combination)		SRK 1
Si1	Fuse	400 ma	0,4 C DIN 41571
St1	Connector, Tuchel-type		FS 910
Tr1	Transformer, power		E 392/3 - 6

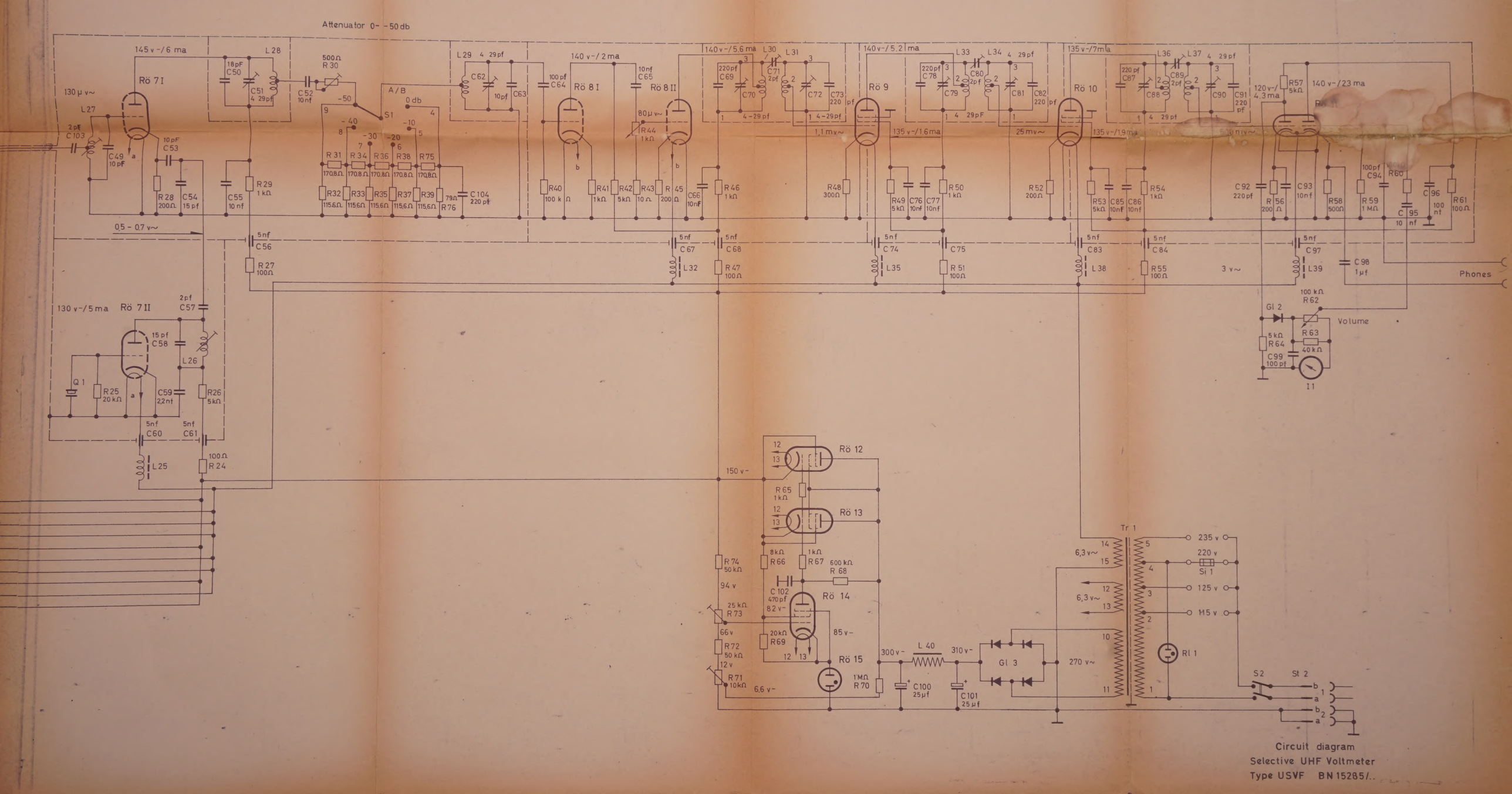
R 8007
1162
Bl. 18



Block diagram

Selective UHF Voltmeter
Type USVF BN 15285/..


Band-pass filter, gain 2.17
62 - 78 Mc
Broadband amplifier
Test output
2nd mixer Gain 3.18
ECC 81
Rö 7,8,11
EF 80
Rö 1
EF 800
Rö 9,10
EL 86
Rö 12,13
EF 804s
Rö 14
EF 94
Rö 3,4,5
EC 93
Rö 2,6
85 A 2
Rö 15
2,5-3mv
(E 392/3-15)
60-Ω-line
20-db-section
R&S-Stock No. 18044-6.20/50
for BN 15285/50
R&S-Stock No. 18044-6.20/60
for BN 15285/60
Rö 1
Rö 2
Rö 3
Rö 4
Rö 5
Rö 6
145 v-/5 ma
140 v-/2 ma
150 v-/1,8 ma
70 v-/13 ma
62 v-/13m
0,6 ma –
0,7-1 v~
250 µ v~
1st oscillator 520-720 Mc
2nd oscillator 82-108 Mc
30-Mc filter
Attenuator 5.3
St 1
Bu 1
ÄZ „f"



Circuit diagram
Selective UHF Voltmeter
Type USVF BN 15285/..

MP MASTER
MA23794